

1.  $(a + b)^2 = a^2 + 2ab + b^2$ ;  $a^2 + b^2 = (a + b)^2 - 2ab$
2.  $(a - b)^2 = a^2 - 2ab + b^2$ ;  $a^2 + b^2 = (a - b)^2 + 2ab$
3.  $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
4.  $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$ ;  $a^3 + b^3 = (a + b)^3 - 3ab(a + b)$
5.  $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$ ;  $a^3 - b^3 = (a - b)^3 + 3ab(a - b)$
6.  $a^2 - b^2 = (a + b)(a - b)$
7.  $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
8.  $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
9.  $a^n - b^n = (a - b)(a^{n-1} + a^{n-2}b + a^{n-3}b^2 + \dots + b^{n-1})$
10.  $a^n = a.a.a \dots n \text{ times}$
11.  $a^m.a^n = a^{m+n}$
12.  $\frac{a^m}{a^n} = a^{m-n}$  if  $m > n$   
 $= 1$  if  $m = n$   
 $= \frac{1}{a^{n-m}}$  if  $m < n$ ;  $a \in R, a \neq 0$
13.  $(a^m)^n = a^{mn} = (a^n)^m$
14.  $(ab)^n = a^n.b^n$
15.  $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
16.  $a^0 = 1$  where  $a \in R, a \neq 0$
17.  $a^{-n} = \frac{1}{a^n}, a^n = \frac{1}{a^{-n}}$
18.  $a^{p/q} = \sqrt[q]{a^p}$
19. If  $a^m = a^n$  and  $a \neq \pm 1, a \neq 0$  then  $m = n$
20. If  $a^n = b^n$  where  $n \neq 0$ , then  $a = \pm b$
21. If  $\sqrt{x}, \sqrt{y}$  are quadratic surds and if  $a + \sqrt{x} = \sqrt{y}$ , then  $a = 0$  and  $x = y$
22. If  $\sqrt{x}, \sqrt{y}$  are quadratic surds and if  $a + \sqrt{x} = b + \sqrt{y}$  then  $a = b$  and  $x = y$
23. If  $a, m, n$  are positive real numbers and  $a \neq 1$ , then  $\log_a mn = \log_a m + \log_a n$
24. If  $a, m, n$  are positive real numbers,  $a \neq 1$ , then  $\log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$
25. If  $a$  and  $m$  are positive real numbers,  $a \neq 1$  then  $\log_a m^n = n \log_a m$
26. If  $a, b$  and  $k$  are positive real numbers,  $b \neq 1, k \neq 1$ , then  $\log_b a = \frac{\log_k a}{\log_k b}$
27.  $\log_b a = \frac{1}{\log_a b}$  where  $a, b$  are positive real numbers,  $a \neq 1, b \neq 1$
28. if  $a, m, n$  are positive real numbers,  $a \neq 1$  and if  $\log_a m = \log_a n$ , then  $m = n$

$$\sin^2 A + \cos^2 A = 1$$

$$1 + \cot^2 A = \csc^2 A$$

$$\tan^2 A + 1 = \sec^2 A$$

II	I	$\sin \theta = \frac{PQ}{OP} = \frac{\text{লম্ব}}{\text{অতিভুজ}}$	$\operatorname{cosec} \theta = \frac{OP}{PQ} = \frac{\text{অতিভুজ}}{\text{লম্ব}}$
sin, cosec	সকল অনুপাত		
ধনাত্মক	ধনাত্মক	$\cos \theta = \frac{OQ}{OP} = \frac{\text{ভূমি}}{\text{অতিভুজ}}$	$\sec \theta = \frac{OP}{OQ} = \frac{\text{অতিভুজ}}{\text{ভূমি}}$
III	IV		
tan, cot	cos, sec	$\tan \theta = \frac{PQ}{OQ} = \frac{\text{লম্ব}}{\text{ভূমি}}$	$\cot \theta = \frac{OQ}{PQ} = \frac{\text{ভূমি}}{\text{লম্ব}}$
ধনাত্মক	ধনাত্মক		

